

Diversity of Plants Belonging to Family Fabaceae, Betalghat block, District Nainital (Kumaun Himalaya)

Naveen Chandra Pandey^{1*} Neha Chopra², G.C. Joshi³ and Lalit M. Tewari⁴

^{1,2,4}Department of Botany, D.S.B. Campus, Kumaun University, Nainital, Uttarakhand.

³Regional Ayurvedic Research Institute (RARI), CCRAS, Ranikhet, Uttarakhand.

E-mail: pandeynaveen10@gmail.com

ABSTRACT

The Indian Himalaya is rich in socio-cultural values, biodiversity and having a vast treasure of medicinal plant. Uttarakhand is a part of Indian Himalayan Region, has a vast number of rivers, tributaries and lakes. Betalghat is a block of Nainital district located at the bank of river Kosi. The study was conducted to document the diversity of plants belonging to family fabaceae of Betalghat block, District Nainital (Kumaun Himalaya). Total 127 plants species belonging to 55 genera of different habits such as herbs (65 species) dominates the area followed by shrubs (33 species), trees (18 species), and climbers (11 species) were recorded. The well preserved plant specimens were deposited in the herbarium division of the Department of Botany, D.S.B. Campus, Kumaun University, Nainital.

Key words: Diversity, Fabaceae family, Betalghat block, Kumaun Himalaya.

INTRODUCTION

al., 2002, Stevens, 2008, Sprent, 2009, Lewis et al., 2005, Rahman et al., 2014, Noreen et al., 2018).

The Indian Himalaya is rich in socio-cultural values, biodiversity and having a vast treasure of medicinal plant. In Himalaya, most of the people live in villages and utilize plants for food, fodder, fuel, medicine, timber and various other purposes (Samant&Dhar, 1997; Arya and Khan, 2015). In the Indian Himalayan region, about 1748 species of medicinal plants (Samant et al., 1998), 675 species of wild edibles (Samant&Dhar, 1997), 279 species of fodder (Samant et al., 1998), 118 species of essential oil yielding medicinal and aromatic plants (Samant&Palni, 2000), and 155 species of sacred plants (Samant& Pant, 2003) have been recorded.

The flora of Uttarakhand has been explored and worked out by several workers (Atkinson, 1882, Duthie, 1906, Osmaston, 1927, Kanjilal, 1928, Gupta, 1968, Raizada&Saxena, 1978, Kalakoti, 1983, Naithani, 1984-1985, Pande, 1984, Pant, 1986, Joshi, 1987, Pangtey&Rawat, 1987, Pangtey et al., 1991, Gaur, 1999, Joshi & Joshi, 2001, Singh & Prakash, 2002, Tewari et al., 2010, Pandey et al., 2016, 2017, Arya et al., 2018, Joshi et al., 2018). The aim of the present study is to document the Diversity of plants belonging to family Fabaceae of Betalaghatal block, of district Nainital (Kumaun Himalaya).

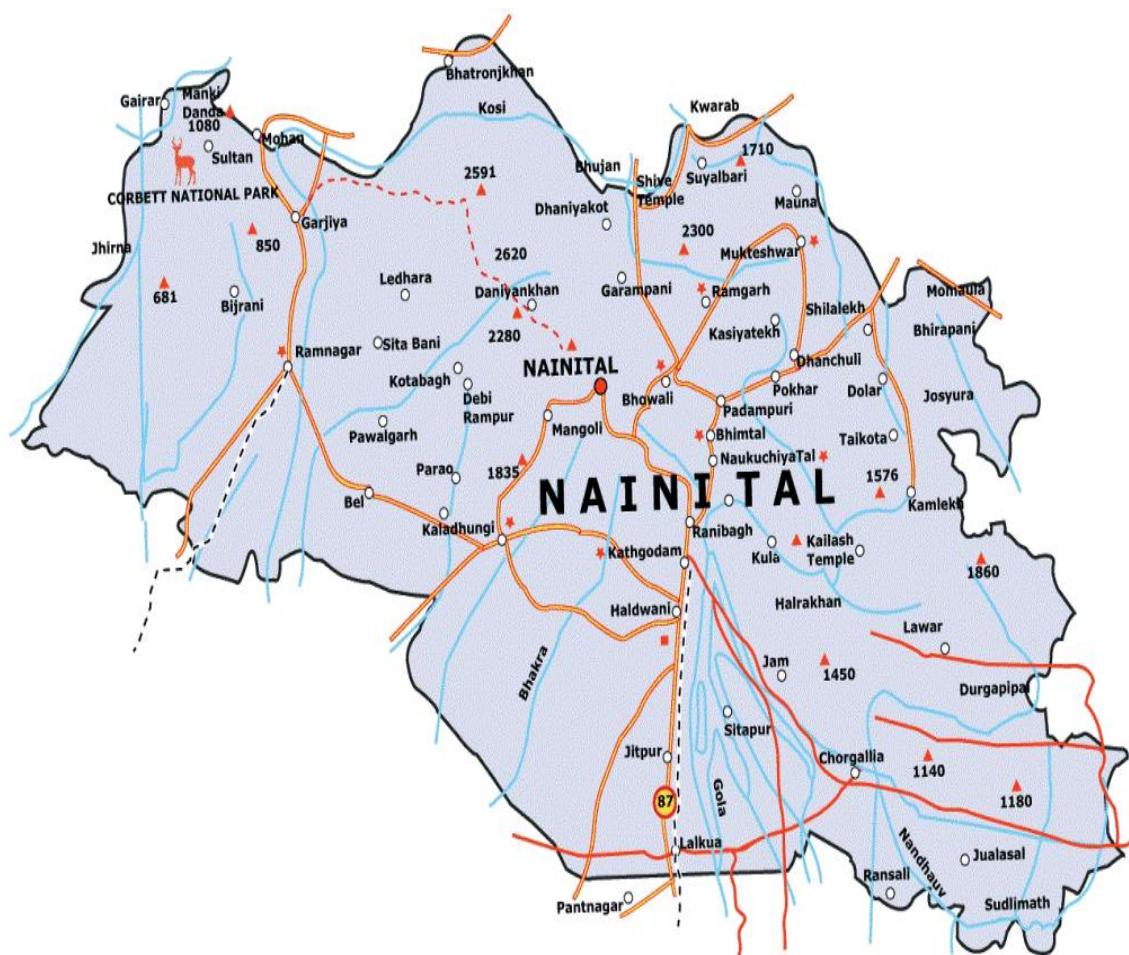
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Figure-1: Map of the study area (Source- <http://www.uttaranchal.org.uk>)

MATERIALS AND METHODS

Geographical description of study area

Betalghat block of district Nainital (during year 2016-2019) lies between $29^{\circ}38'925''$ N latitudes and $79^{\circ}49'465''$ E longitudes (Fig.-1). The region is bordered by Ramgarh block on the east, Sult block on the west, Tarikhet and Bhikyasain block on the north and Kotabag block on the south (Pandey et al., 2017).

Data Collection and Sample Identification

The study was conducted in nine sites (Betalghat, Bhatrojhan, Bhowali, Garampani, Korar, Niglaat, Pangkatara, Raatighat and Simalkha) of Betalghat block. Specimens of all the plants were collected and identified with the help of relevant floras and herbaria (Osmaston, 1927, Naithani, 1984-1985, Gaur, 1999, Joshi et al., 2018). The specimens collected from the field were deposited in the herbarium division of the Department of Botany, D.S.B. Campus, Kumaun University, Nainital.

The geography of the Himalayan region is very unique and diverse system that is high and rich source of plant diversity which supports the vast group of rural communities by providing all the necessary and important resources to make their livelihood easier thus it is the major source of economy. In the present study a total of 127 plant species with 55 genera of family fabaceae from Betalghat block, district Nainital (Kumaun Himalaya) were recorded. Diversity of herbaceous flora (65 species) dominates the area followed by shrubs (33 species), trees (18 species), and climbers (11 species) (Fig.-2). *Desmodium* (13 species), *Crotalaria* (12 species), *Cassia* and *Indigofera* (7 each species), *Vigna* (6 species), *Bauhinia* (5 species), *Acacia*, *Flemingia* and *Vicia* (4 each species), and *Albizia* (3 species) were the most dominant genera occurring in the region (Fig.-3). The recorded plant species have been enumerated along with their families, local names, habit, and altitudinal range (m) and flowering and fruiting time (Table-1).

Gupta (1968) reported 69 species of family fabaceae from Nainital, Kalakoti (1983) reported 119 species from the Nainital hills, Pande (1984) reported 101 species from Almora District, Samant (1987) reported 114 species from central and south-eastern part of Pithoragarh, Gaur (1999)

RESULTS AND DISCUSSION

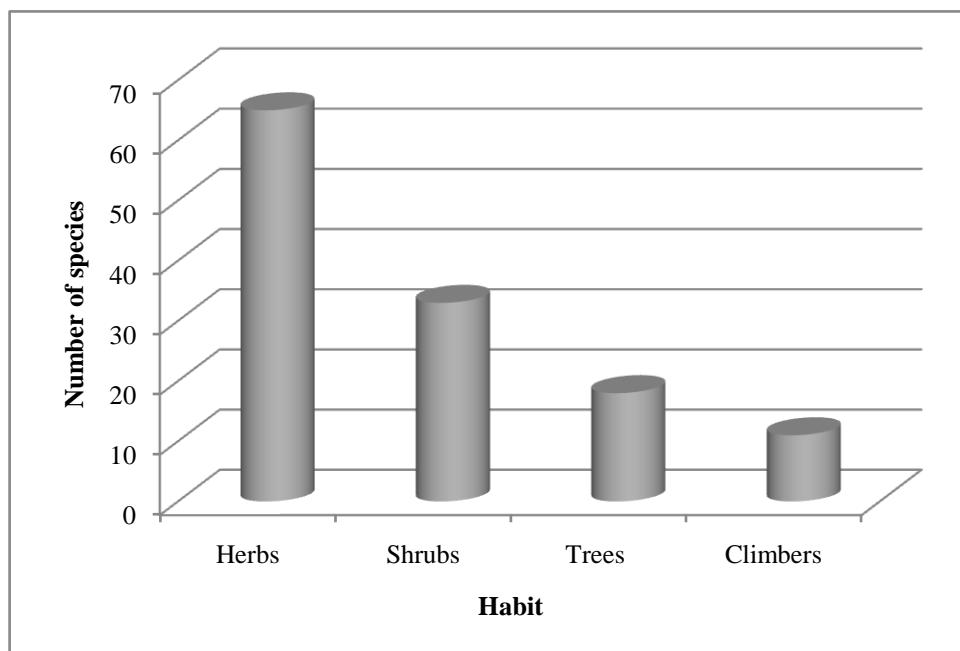
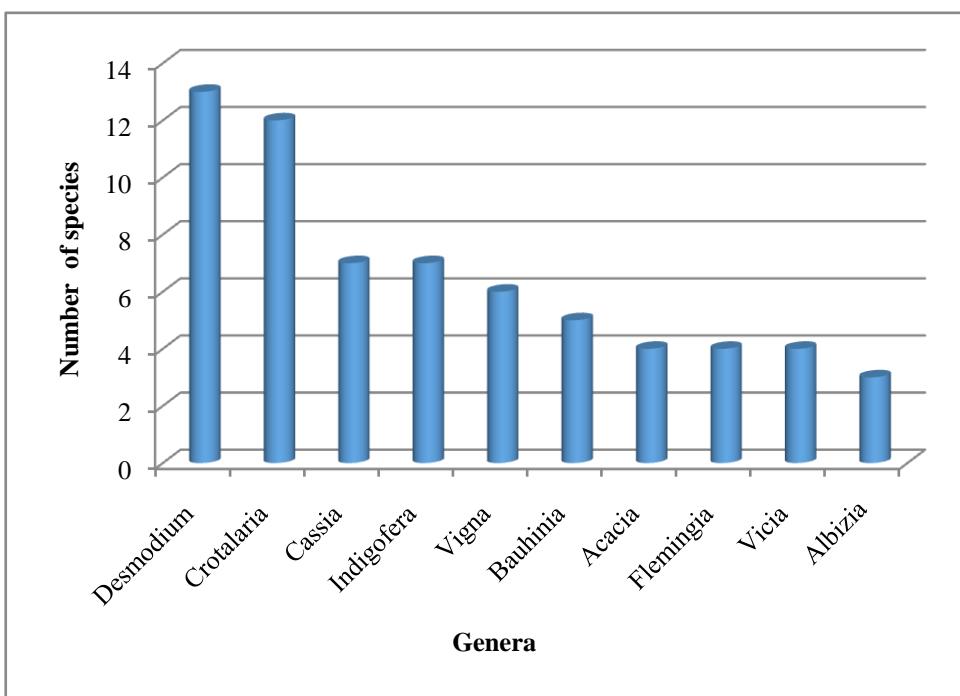
Table 1. Diversity of Plants Belonging to Family Fabaceae, Betalghat block, District Nainital (Kumaun Himalaya)

S. No.	Local Name	Botanical Name	Family	Habit	Altitudinal Range (m)	Fl & Fr Time
1.	Ratti	<i>Abrus precatorius</i> L.	Fabaceae	CI	700-1200	Aug-Mar
2.	Safed Ratti	<i>Abrus pulchellus</i> Wall. ex Thwaites	Fabaceae	CI	700-1200	Aug-Dec
3.	Khair	<i>Acacia catechu</i> (L.f.) Willd.	Fabaceae	T	700-1300	May-Jan
4.	Acacia	<i>Acacia dealbata</i> L.	Fabaceae	T	1200-1800	Feb-Aug
5.	Vilayati Kikar	<i>Acacia farnesiana</i> (L.) Willd.	Fabaceae	Sh	700-1800	Jan-Jul
6.	Agali	<i>Acacia pennata</i> (L.) Willd.	Fabaceae	CI	700-1400	Aug-Sep
7.	-	<i>Aeschynomene indica</i> L.	Fabaceae	H	700-1200	Aug-Dec
8.	Siris	<i>Albizia chinensis</i> (Osbeck) Merr.	Fabaceae	T	300-1500	Apr-Mar
9.	Kuneri	<i>Albizia julibrissin</i> Durazz.	Fabaceae	T	1200-2500	Apr-Dec
10.	Siris	<i>Albizia lebbeck</i> (L.) Benth.	Fabaceae	T	400-1500	Apr-Nov
11.	Sherva	<i>Alysicarpus vaginalis</i> (L.) DC.	Fabaceae	H	700-1400	Jul-Dec
12.	Moogphali	<i>Arachis hypogaea</i> L.	Fabaceae	H	700-1400	Aug-Dec
13.	-	<i>Argyrolobium flaccidum</i> (Royle) Jaub	Fabaceae	H	700-1500	Aug-Oct
14.	-	<i>Argyrolobium roseum</i> (Camb.) Jaub.	Fabaceae	H	700-1800	Aug-Oct
15.	Rudravanti	<i>Astragalus leucocephalus</i> Grah. ex Benth.	Fabaceae	H	1600-1800	Mar-Jun
16.	Ban-Tor	<i>Atylosia volubilis</i> (Blanco) Gamble	Fabaceae	H	700-1500	Feb-Apr
17.	-	<i>Bauhinia malabarica</i> Roxb.	Fabaceae	T	700-1100	Aug-Mar
18.	Kwieyal	<i>Bauhinia purpurea</i> L.	Fabaceae	T	700-1600	Sep-Mar
19.	Kandela	<i>Bauhinia semla</i> Wunder.	Fabaceae	T	700-1700	Sep-Apr
20.	Malujhan	<i>Bauhinia vahli</i> Wight & Arn.	Fabaceae	CI	700-1500	Apr-Sep
21.	Kanchnar	<i>Bauhinia variegata</i> L.	Fabaceae	T	700-1700	Feb-Aug
22.	Karanj	<i>Caesalpinia bonduc</i> (L.) Roxb.	Fabaceae	CI	700-1000	Jul-Mar
23.	Karanj	<i>Caesalpinia decapetala</i> (Roth) Alston	Fabaceae	Sh	700-1200	Feb-Nov
24.	Arhar	<i>Cajan uscajan</i> (L.) Huth.	Fabaceae	H	700-1500	Aug-Nov
25.	-	<i>Calliandra haematocephala</i> Hassk.	Fabaceae	Sh	700-1000	Aug-Nov
26.	-	<i>Campylotropis seriocarpa</i> Schindl.	Fabaceae	Sh	1500-1800	Jul-Dec
27.	Banar	<i>Cassia absus</i> L.	Fabaceae	H	700-1000	Aug-Dec
28.	Amaltas	<i>Cassia fistula</i> L.	Fabaceae	T	300-1400	Apr-Jan
29.	Taror	<i>Cassia floribunda</i> Cav.	Fabaceae	Sh	800-1800	Jun-Feb
30.	Banar	<i>Cassia mimosoides</i> L.	Fabaceae	H	700-1800	Jul-Oct
31.	Banar	<i>Cassia occidentalis</i> L.	Fabaceae	Sh	700-1600	Jul-Oct
32.	-	<i>Cassia surattensis</i> Burm. f.	Fabaceae	T	700-1500	Apr-Sep
33.	Banar	<i>Cassia tora</i> L.	Fabaceae	H	700-1300	Jul-Dec
34.	Chana	<i>Cicer arietinum</i> L.	Fabaceae	H	700-1800	Feb-Apr
35.	-	<i>Crotalaria albida</i> Heyne ex Roth	Fabaceae	H	700-1800	Mar-Nov
36.	Phatphaitya	<i>Crotalaria bialata</i> Schrank.	Fabaceae	H	700-1800	Aug-Dec
37.	Phatphaitya	<i>Crotolariacalycina</i> Schrank.	Fabaceae	H	700-1800	Jul-Dec
38.	Jhuri-Jhunia	<i>Crotalaria humifusa</i> Graham ex Benth.	Fabaceae	H	700-1500	Jul-Dec
39.	Jhuri-Jhunia	<i>Crotalaria incana</i> L.	Fabaceae	H	700-1200	Jun-Sep
40.	-	<i>Crotalaria medicaginea</i> Lam.	Fabaceae	H	700-1300	Apr-Aug

41.	-	<i>Crotalaria mysorensis</i> Roth	Fabaceae	H	700-1600	Aug-Jan
42.	Phatphatiya	<i>Crotalaria pallida</i> Aiton.	Fabaceae	H	700-1400	Sep-Nov
43.	-	<i>Crotalaria prostrata</i> Rottl. ex Willd.	Fabaceae	H	700-1800	Jul-Oct
44.	Phatphatiya	<i>Crotolariasessiliflora</i> L.	Fabaceae	H	700-1500	Aug-Oct
45.	Chun-Chuni	<i>Crotalaria spectabilis</i> Roth	Fabaceae	H	700-1600	Sep-Apr
46.	Phatphatiya	<i>Crotalaria tetragona</i> Roxb. ex Andrews	Fabaceae	H	700-1500	Aug-Dec
47.	Ghogra	<i>Dalbergiasericea</i> G. Don	Fabaceae	T	700-1300	Mar-Aug
48.	Sisham	<i>Dalbergiasissoo</i> Roxb.	Fabaceae	T	700-1500	Mar-Jun
49.	Sakina	<i>Desmodiumconcinnum</i> DC.	Fabaceae	Sh	700-1800	Aug-Nov
50.	Chamlai	<i>Desmodiumelegans</i> DC.	Fabaceae	Sh	1400-1800	Apr-Oct
51.	Salprani	<i>Desmodiumgangeticum</i> (L.) DC.	Fabaceae	Sh	700-1800	Mar-Dec
52.	Sakina	<i>Desmodiumheterocarpon</i> (L.) DC.	Fabaceae	Sh	700-1800	Aug-Nov
53.	Sakina	<i>Desmodiumlaxiflorum</i> DC.	Fabaceae	Sh	700-1800	Aug-Dec
54.	Sakina	<i>Desmodiummicrophyllum</i> (Thunb.) DC.	Fabaceae	H	900-1800	Jan-Dec
55.	Sakina	<i>Desmodiummotorium</i> Houtt.	Fabaceae	H	700-1600	Jul-Nov
56.	Sakina	<i>Desmodiummultiflorus</i> DC	Fabaceae	Sh	700-1600	Jul-Oct
57.	Sakina	<i>Desmodiumoxyphyllum</i> DC.	Fabaceae	H	1300-1800	Jul-Oct
58.	Sakina	<i>Desmodiumpodocarpum</i> DC.	Fabaceae	Sh	700-1800	Aug-Oct
59.	Sakina	<i>Desmodiumpullchellum</i> (L.) Benth.	Fabaceae	Sh	700-1000	Jul-Nov
60.	Sakina	<i>Desmodiumtriflorum</i> (L.) DC.	Fabaceae	H	700-1800	Jul-Sep
61.	Sakina	<i>Desmodiumvelutinum</i> (Willd.) DC.	Fabaceae	Sh	700-1500	Sep-Dec
62.	-	<i>Dolichostenuicaulis</i> (Baker) Craib	Fabaceae	H	1500-1800	Aug-Oct
63.	-	<i>Dumasiavillosa</i> DC.	Fabaceae	H	700-1800	Aug-Oct
64.	Mandir	<i>Erythrinaarborescens</i> Roxb.	Fabaceae	Sh	1500-1800	Aug-oct
65.	Rungar	<i>Erythrinasperosa</i> Roxb.	Fabaceae	T	700-1500	Mar-Jun
66.	Salprani	<i>Flemingiabracteata</i> (Roxb.) Wight	Fabaceae	Sh	700-1800	Sep-Jan
67.	Cheena	<i>Flemingiaprocumbens</i> Roxb.	Fabaceae	H	1600-1800	Jul-Oct
68.	Salprani	<i>Flemingiasemialata</i> Roxb.	Fabaceae	Sh	700-1800	Aug-Oct
69.	Salprani	<i>Flemingiastrobilifera</i> (L.) R. Br.	Fabaceae	Sh	700-1800	Sep-Dec
70.	Soyabean	<i>Glycine max</i> (L.) Merr.	Fabaceae	H	700-1800	Aug-Nov
71.	Sakina	<i>Indigoferaastragalina</i> DC.	Fabaceae	H	700-1300	Aug-Nov
72.	Kala-sakina	<i>Indigoferaatropurpurea</i> Buch.-Ham.	Fabaceae	Sh	900-1600	Aug-Nov
73.	Sakina	<i>Indigoferacassiodoides</i> Rottler ex DC.	Fabaceae	Sh	700-1800	Jan-Jun
74.	-	<i>Indigoferacylindracea</i> Graham. ex Baker	Fabaceae	Sh	1200-1800	Aug-Dec
75.	Sakina	<i>Indigoferadosua</i> Buch.-Ham. ex D. Don	Fabaceae	Sh	1300-1800	May-Sep
76.	Sakina	<i>Indigoferaheterantha</i> Wall. ex Brandis.	Fabaceae	Sh	700-1800	May-Nov
77.	Sakina	<i>Indigoferalinifolia</i> (L. f.) Retz.	Fabaceae	H	700-1500	Mar-Nov
78.	Sem	<i>Lablab purpureus</i> (L.) Sweet	Fabaceae	Cl	700-1300	Nov-Jun
79.	Kurphali	<i>Lathyrusaphaca</i> L.	Fabaceae	H	700-1800	Feb-May
80.	Kurphali	<i>Lathyrussphaericus</i> Retz.	Fabaceae	H	700-1800	Feb-May
81.	Masoor	<i>Lens culinaris</i> Medik.	Fabaceae	H	700-1800	Feb-Apr
82.	Khunja	<i>Lespedeza gerardiana</i> Garham. ex Maxim.	Fabaceae	Sh	800-1700	Aug-Oct
83.	-	<i>Lespedeza juncea</i> (L.f.) Pers.	Fabaceae	Sh	1300-1800	Aug-Nov
84.	-	<i>Lespedeza stenocarpa</i> Maxim.	Fabaceae	Sh	700-1800	Feb-Jun

85.	Vilaitibaval	<i>Leucaenaleucocephala</i> (Lam.) De Wit.	Fabaceae	T	700-1200	Sep-Dec
86.	-	<i>Lotus corniculatus</i> L.	Fabaceae	H	1200-1800	Apr-Oct
87.	Gehat	<i>Macrotylomauniflorum</i> (Lam.) Verdc.	Fabaceae	H	700-1800	Aug-Oct
88.	Bish-Kapru	<i>Medicagolupulinal</i> .	Fabaceae	H	700-1600	Nov-May
89.	Banmethi	<i>Melilotusindica</i> (L.) All.	Fabaceae	H	700-1500	Jan-May
90.	Gouj	<i>Millettiaextensa</i> Benth. ex Baker f.	Fabaceae	Cl	700-1300	Apr-Sep
91.	Aal	<i>Mimosa himalayana</i> Gamble	Fabaceae	Sh	700-1600	Jun-Oct
92.	Chhui-mui	<i>Mimosa pudical</i> .	Fabaceae	H	700-1200	Aug-Nov
93.	Bhaisalu	<i>Mucunanigricans</i> (Lour.) Steud.	Fabaceae	Cl	700-1300	Aug-Dec
94.	Gaunji	<i>Mucunapruriens</i> (L.) DC.	Fabaceae	Cl	700-1300	Sep-Dec
95.	Sandan	<i>Ougeiniaoojeinensis</i> (Roxb) Hochst.	Fabaceae	T	700-1600	Mar-Jun
96.	Bean	<i>Phaseoluslunatus</i> L.	Fabaceae	H	700-1800	Jul-Nov
97.	Rajma	<i>Phaseolusvulgaris</i> L.	Fabaceae	H	700-1800	Aug-Nov
98.	Kaliyon	<i>Pisumarvense</i> L.	Fabaceae	H	700-1800	Mar-May
99.	Mattar	<i>Pisumsativum</i> L.	Fabaceae	H	700-1800	Feb-May
100.	Bilaikand	<i>Puerariaphaseoloides</i> (Roxb.) Benth.	Fabaceae	Sh	700-1600	Mar-Jun
101.	Bilaikand	<i>Puerariatuberosa</i> (Roxb. ex Willd.) DC.	Fabaceae	Sh	700-1500	Mar-Dec
102.	-	<i>Rhynchosia minima</i> (L.,) DC.	Fabaceae	H	700-1200	Jun-Sep
103.	Robinia	<i>Robiniapseudoacacia</i> L.	Fabaceae	T	700-1600	May-Oct
104.	Ghoytiya	<i>Shuteriainvolucrata</i> (Wall.) Wt. &Arn.	Fabaceae	Cl	700-1800	Nov-Apr
105.	-	<i>Smithiaciliata</i> Royle	Fabaceae	H	1300-1800	Jul-Sep
106.	-	<i>Sophoramollis</i> (Royle)	Fabaceae	Sh	700-1300	Mar-Jul
107.	Imali	<i>Tamarindusindica</i> L.	Fabaceae	T	700-1100	May-Apr
108.	-	<i>Tephrosia candida</i> (Roxb.) DC.	Fabaceae	Sh	700-1300	Jun-Feb
109.	Sarphhoka	<i>Tephrosiapurpurea</i> (L.) Pers.	Fabaceae	Sh	700-1400	Sep-Dec
110.	BerseemGhas	<i>Trifoliumalexandrinum</i> L.	Fabaceae	H	700-1200	Mar-May
111.	Tipatiya	<i>Trifoliumrepens</i> L.	Fabaceae	H	700-1800	Apr-Jul
112.	-	<i>Trigonellacorniculata</i> (L.) L.	Fabaceae	H	700-1800	Apr-Jul
113.	Methi	<i>Trigonellafoenum-graecum</i> L.	Fabaceae	H	700-1800	Mar-May
114.	-	<i>Trigonellaincisa</i> DC.	Fabaceae	H	700-1500	Mar-Jun
115.	-	<i>Urariailogopus</i> DC.	Fabaceae	H	700-1300	Sep-Nov
116.	Bakla	<i>Viciafaba</i> L.	Fabaceae	H	700-1800	Dec-May
117.	Kura	<i>Viciahirsuta</i> (L.) Gray.	Fabaceae	H	700-1800	Mar-May
118.	-	<i>Viciarigidula</i> Royle	Fabaceae	H	1600-1800	Aug-Nov
119.	Ankra	<i>Vicia sativa</i> L.	Fabaceae	H	700-1800	Aug-Sep
120.	Rayans	<i>Vignaangularis</i> (Willd.) Ohwi&Ohashi.	Fabaceae	H	700-1800	Aug-Nov
121.	Mash	<i>Vigna mungo</i> (L.)	Fabaceae	H	700-1800	Aug-Nov
122.	Moong	<i>Vignaradiata</i> (L.) Wilczek	Fabaceae	H	700-1400	Aug-Nov
123.	Moth	<i>Vignatrilobata</i> (L.) Verdc.	Fabaceae	H	700-1400	Aug-Nov
124.	Bhotiya dal	<i>Vignaumbellata</i> (Thunb.) Ohwi&Ohashi	Fabaceae	H	700-1800	Sep-Dec
125.	Machali	<i>Vignavaxillata</i> (L.) Rich.	Fabaceae	H	900-2500	Aug-Nov
126.	-	<i>Wisteria chinensis</i> (Sweet) DC	Fabaceae	Cl	700-1800	Apr-Jul
127.	Dwipat	<i>Zorniagibbosa</i> Span.	Fabaceae	H	700-1800	Aug-Nov

Abbreviation Used- T- Tree; Sh- Shrub; H- Herb; Cl- Climber; Fl& Fr- Flowering and Fruiting.

Figure 2: Habit of plant species of the region**Figure 3: Dominant Genera of the region**

reported 178 species from Garhwal, North-West Himalaya, Chaudhary (2010) reported 51 species from Vindhya region of Uttar Pradesh, Kumari (2011) reported 99 species from Almora District, Wariss et al., (2013) reported 154 species from Cholistan Desert, Pakistan, Kumar et al., (2014) reported 41 species from Papagini river catchment areas, Andhra Pradesh, India, Rahman and Parvin (2014) reported 32 species from Rajshahi, Bangladesh, Nagarajan et al., (2017) reported 100

species from Indian Institute of Technology-Madras, Chennai, Joshi et al., (2018) reported 99 species from Ranikhet, West Himalaya and Kushwaha et al., (2018) reported 110 species from Sonbhadra District, Utar Pradesh. Pictures of some plants are given in [Figure-4](#).

Figure-4. Diversity of Plants Belonging to Family Fabaceae

			
<i>Abrus precatorius</i>	<i>Bauhinia semla</i>	<i>Bauhinia vahlii</i>	<i>Bauhinia variegata</i>
			
<i>Cassia occidentalis</i>	<i>Cassia tora</i>	<i>Crotalaria spectabilis</i>	<i>Crotalaria tetragona</i>
			
<i>Dalbergia sissoo</i>	<i>Desmodium concinnum</i>	<i>Desmodium elegans</i>	<i>Desmodium laxiflorum</i>
			
<i>Desmodium velutinum</i>	<i>Erythrina arborescens</i>	<i>Erythrina suberosa</i>	<i>Flemingia procumbens</i>
			
<i>Flemingia semialata</i>	<i>Indigofera astragalina</i>	<i>Indigofera sphaerocarpa</i>	<i>Millettia extensa</i>
			
<i>Ougeinia oojeiensis</i>	<i>Pueraria tuberosa</i>	<i>Tephrosia candida</i>	<i>Vigna vexillata</i>

CONCLUSION

Documentation of these species may provide basic information for conservation and sustainable development of the Himalayan region. This detailed information will be helpful for the students, researchers and botanist for the collection and identification of the plant for their research work.

Conflicts of Interest

Authors declare that there is no conflict of interests regarding the publication of this paper.

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